FINAL REPORT
JULY 1997

REPORT NO. 97-04

2.75-INCH, HYDRA 70, PA150, ROCKET PALLET FIRST ARTICLE TESTING (FAT)

Prepared for:
U.S. Army Armament Research, Development and Engineering Center
ATTN: AMSTA-AR-ESK
Rock Island, IL 61299-7300

Distribution Unlimited

VALIDATION ENGINEERING DIVISION
SAVANNA, ILLINOIS 61074-9639

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Quinn D. Hartman

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19. ABSTRACT (*Continue on reverse if necessary and identify by block number*)

The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SIOAC-DEV), was tasked by the U.S. Army Armament Research, Development and Engineering Center (ARDEC) to conduct first article MIL-STD-1660, Design Criteria for Ammunition Unit Loads, testing on the 2.75-inch, Hyrdra 70, PA150, rocket pallet produced by Delfasco of Tennessee, Greeneville, TN. Results from the MIL-STD-1660 testing indicated that the pallet, adapters, and containers produced by Delfasco met MIL-STD-1660 test requirements.

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22a. NAME OF RESPONSIBLE INDIVIDUAL JEROME H. KROHN	22b. TELEPHONE (*Include Area Code*) 815-273-8929 / 22c. OFFICE SYMBOL SIOAC-DEV

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U.S. ARMY DEFENSE AMMUNITION CENTER
VALIDATION ENGINEERING DIVISION
SAVANNA, IL 61074-9639

REPORT NO. 97-04

2.75-INCH, HYDRA 70, PA150, ROCKET PALLET FIRST ARTICLE TESTING (FAT)

TABLE OF CONTENTS

PART 1

INTRODUCTION

A. BACKGROUND. The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SIOAC-DEV), was tasked by the U.S. Army Armament Research, Development and Engineering Center (ARDEC) to conduct first article MIL-STD-1660, Design Criteria for Ammunition Unit Loads, testing on the 2.75-inch, Hydra 70, PA150, rocket pallet produced by Delfasco of Tennessee, Greeneville, TN.

B. AUTHORITY. This test was conducted IAW mission responsibilities delegated by the U.S. Army Armament, Munitions and Chemical Command (AMCCOM), Rock Island, IL. Reference is made to the following:

1. Change 4, 4 October 1974, to AR740-1, 23 April 1973, Storage and Supply Activity Operation.

2. AMCCOM-R, 10-17, Mission and Major Functions of USADACS, 13 January 1986.

C. OBJECTIVE. The objective of the tests was to determine if the pallets produced by Delfasco met MIL-STD-1660 test requirements prior to the acceptance of the pallets by the U.S. Army (USA).

D. CONCLUSION. Two of the three pallets submitted by Delfasco were evaluated using MIL-STD-1660 test requirements. No significant flaws were found in the two pallets during testing so the third pallet was not evaluated. As a result of the performance of the pallets during testing, the 2.75-inch, Hydra 70, PA150, rocket pallet produced by Delfasco is recommended for USA-wide use.

PART 2

MARCH - AUGUST 1996

ATTENDEES

Quinn D. Hartman General Engineer DSN 585-8992 815-273-8992	Director U.S. Army Defense Ammunition Center ATTN: SIOAC-DEV 3700 Army Depot Road Savanna, IL 61074-9639
Jerry H. Krohn Supervisory General Engineer DSN 585-8908 815-273-8908	Director U.S. Army Defense Ammunition Center ATTN: SIOAC-DEV 3700 Army Depot Road Savanna, IL 61074-9639
Thomas J. Michels Supervisory General Engineer DSN 585-8080 815-273-8080	Director U.S. Army Defense Ammunition Center ATTN: SIOAC-DES 3700 Army Depot Road Savanna, IL 61074-9639
Mark Rehmstedt Packaging Engineer DSN 493-8206 309-782-8206	U.S. Army Armament Research, Development and Engineering Center ATTN: AMSTA-AR-ESK Rock Island, IL 61299-7300

PART 3

TEST PROCEDURES

The test procedures outlined in this section were extracted from MIL-STD-1660, Design Criteria for Ammunition Unit Loads, 8 April 1977. This standard identifies nine steps that a unitized load must undergo if it is to be considered acceptable. The four tests that were conducted on the test pallets are summarized below.

A. STACKING TEST. The unit load was loaded to simulate a stack of identical unit loads stacked 16 feet high, for a period of one hour. This stacking load was simulated by subjecting the unit load to a compression weight equal to an equivalent 16-foot stacking height. The compression load was calculated in the following manner. The unit load weight was divided by the unit load height in inches and multiplied by 192. The resulting number was the equivalent compressive force of a 16-foot-high load.

B. REPETITIVE SHOCK TEST. The repetitive shock test was conducted IAW Method 5019, Federal Standard 101. The test procedure is as follows: The test specimen was placed on, but not fastened to, the platform. With the specimen in one position, the platform was vibrated at 1/2-inch amplitude (1-inch double amplitude) starting at a frequency of approximately 3 cycles per second. The frequency was steadily increased until the package left the platform. The resonant frequency was achieved when a 1/16-inch-thick feeler gage momentarily slid freely between every point on the specimen in contact with the platform at some instance during the cycle or a platform acceleration achieved 1 +/- 0.1 Gs. Midway into the testing period, the specimen was rotated 90 degrees and the test continued for the duration. Unless failure occurred, the total time of vibration was two hours if the specimen was tested in one position and three hours for more than one position.

C. EDGEWISE ROTATIONAL DROP TEST. This test was conducted using the procedures of Method 5008, Federal Standard 101. The procedure for the edgewise rotational drop test is as follows: The specimen was placed on its skids with one end of the pallet supported on a beam 4-1/2 inches high. The height of the beam was increased if necessary to ensure that there was no support for the skids between the ends of the pallet when dropping took place, but was not high enough to cause the pallet to slide on the supports when the dropped end was raised for the drops. The unsupported end of the pallet was then raised and allowed to fall freely to the concrete, pavement, or similar underlying surface from a prescribed height. Unless otherwise specified, the height of drop for level A protection conforms to the following tabulation:

GROSS WEIGHT (WITHIN RANGE LIMITS) (Pounds)	DIMENSIONS OF ANY EDGE, HEIGHT OR WIDTH (WITHIN RANGE LIMITS) (Inches)	HEIGHT OF DROPS ON EDGES	
		Level A (Inches)	Level B (Inches)
150 - 250	60 - 66	36	27
250 - 400	66 - 72	32	24
400 - 600	72 - 80	28	21
600 - 1,000	80 - 95	24	18
1,000 - 1,500	95 - 114	20	16
1,500 - 2,000	114 - 144	17	14
2,000 - 3,000	Above 145 - No limit	15	12
Above - 3,000		12	9

D. INCLINE-IMPACT TEST. This test was conducted by using the procedure of Method 5023, Incline-Impact Test of Federal Standard 101. The procedure for the incline-impact test is as follows: The specimen was placed on the carriage with the surface or edge to be impacted

projecting at least 2 inches beyond the front end of the carriage. The carriage was brought to a predetermined position on the incline and released. If it was desired to concentrate the impact on any particular position on the container, a 4- by 4-inch timber was attached to the bumper in the desired position before the test. No part of the timber was struck by the carriage. The position of the container on the carriage and the sequence in which surfaces and edges were subjected to impacts was at the option of the testing activity and depends upon the objective of the tests. This test was to determine satisfactory requirements for a container or pack, and, unless otherwise specified, the specimen was subjected to one impact on each surface that has each dimension less than 9.5 feet. Unless otherwise specified, the velocity at time of impact was 7 feet per second.

PART 4

TEST EQUIPMENT

A. Compression Tester.

1. Manufacturer:	Ormond Manufacturing
2. Platform:	60- by 60-inches
3. Compression Limit:	50,000 pounds
4. Tension Limit:	50,000 pounds

B. Transportation Simulator.

1. Manufacturer:	Gaynes Laboratory
2. Capacity:	6,000-pound pallet
3. Displacement:	1/2-inch amplitude
4. Speed:	50 to 400 rpm
5. Platform:	5- by 8-foot

C. Inclined Plane.

1. Manufacturer:	Conbur Incline
2. Type:	Impact Tester
3. Grade:	10 percent incline
4. Length:	12-foot

PART 5

TEST RESULTS

Two of three pallets submitted by Delfasco of Tennessee were inertly loaded to the specified design weight using two 4- by 4-inch lengths of lumber, two 2- by 4-inch lengths of lumber, and a quantity of ammunition simulant to bring each container individually to the required weight. Special care was taken to ensure that each container had the proper amount of weight in order to achieve a realistic pallet center of gravity (CG). Once properly prepared, the first two pallets were tested using MIL-STD-1660, Design Criteria for Ammunition Unit Loads, requirements. As a result of the good performance of the pallets during testing, the third pallet submission was not tested.

A. PALLET NO. 1.

Date:	19 November 1996
Weight:	2,245 pounds
Length:	78-1/2 inches
Width:	29-3/8 inches
Height:	43-1/2 inches

1. Compression Test. The test pallet was compressed with a load force of 9,900 pounds for 60 minutes. No damage was noted as a result of this test.

2. Repetitive Shock Test. The test pallet was vibrated 90 minutes at 220 RPM in the longitudinal orientation and 90 minutes at 185 RPM in the lateral orientation. Small cracks were noted to have formed in the pallet posts next to the pallet skids at the completion of the longitudinal vibration test. No change in the cracks was noted after the lateral vibration.

3. Edgewise Rotational Drop Test. The test pallet was edgewise rotationally dropped from a height of 15-inches on the longitudinal and lateral drops. No additional cracking was noted in the pallet posts.

4. Sling Compatibility Test. The test pallet was lifted off of the ground using the toplift adapter by four points, three points, two diagonal points, two adjacent points, and one point. No shifting of the containers or permanent deformation of the toplift adapter was noted.

5. Incline-Impact Test. The test pallet was incline-impacted on all four sides from a height of 8 feet. No additional damage was noted at the completion of the test.

6. Post Test Inspection. Following completion of MIL-STD-1660 testing, the pallet was disassembled and inspected for additional damage. The cracks noted at the completion of the longitudinal vibration test had not increased significantly. No significant damage was noted in the top or bottom adapters or the pallet deck.

B. PALLET NO. 2.

Date:	20 November 1996
Weight:	2,245 pounds
Length:	78-1/2 inches
Width:	29-3/8 inches
Height:	43-1/2 inches

1. Compression Test. The test pallet was compressed with a load force of 9,900 pounds for 60 minutes. No damage was noted as a result of this test.

2. Repetitive Shock Test. The test pallet was vibrated 90 minutes at 220 rpm in the longitudinal orientation and 90 minutes at 155 rpm in the lateral orientation. Three small cracks were noted to have formed in the pallet posts next to the pallet skids at the completion of the longitudinal vibration test. Following completion of the lateral vibration, the cracks were noted

to have increased in size and extended from the edge of the skid up to the strengthening dimple in the pallet post.

3. Edgewise Rotational Drop Test. The test pallet was edgewise rotationally dropped from a height of 15 inches on the longitudinal and lateral drops. No additional cracking was noted in the pallet posts.

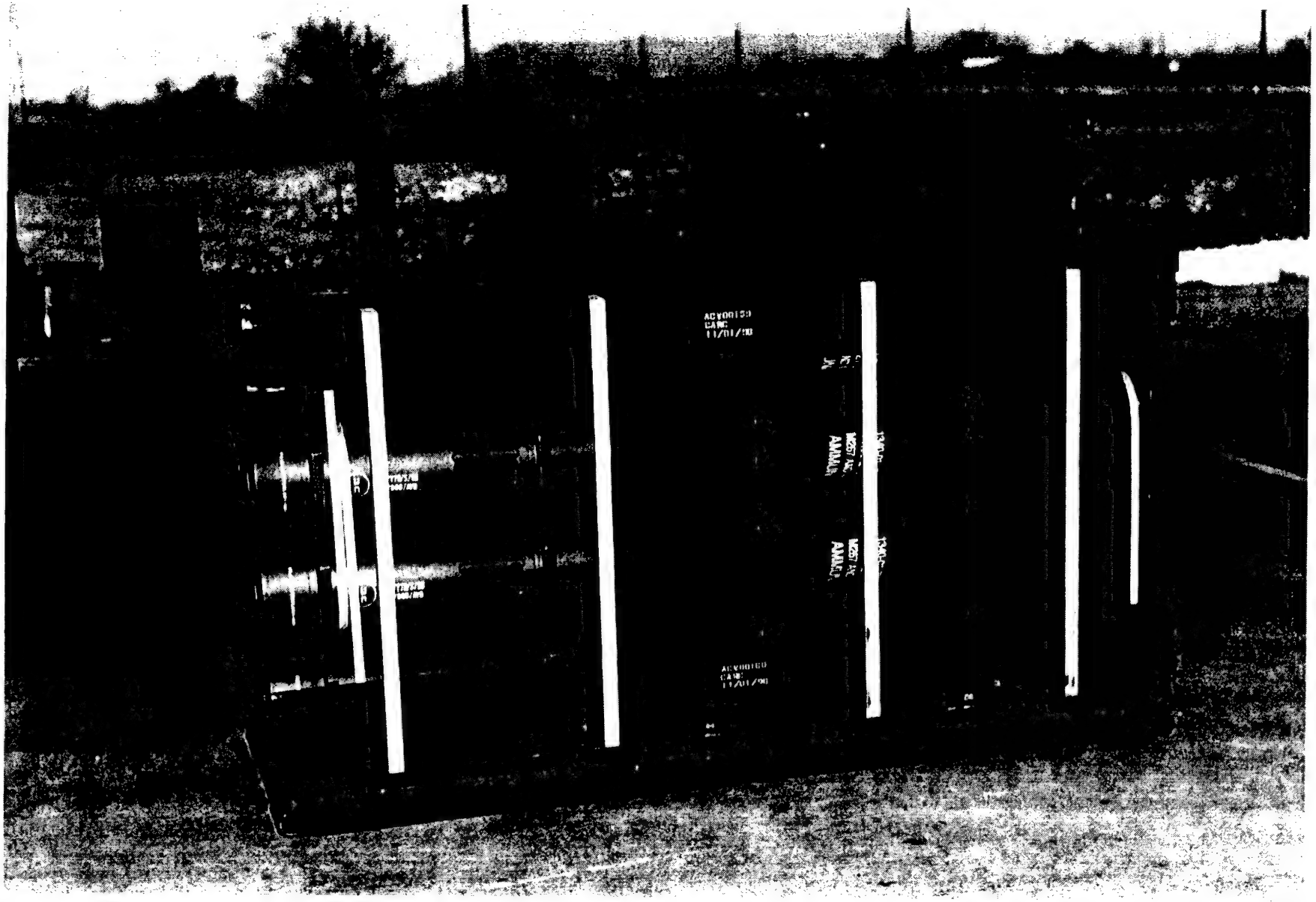
4. Sling Compatibility Test. The test pallet was lifted off of the ground using the toplift adapter by four points, three points, two diagonal points, two adjacent points, and one point. No shifting of the containers or permanent deformation of the toplift adapter was noted.

5. Incline-Impact Test. The test pallet was incline-impacted on all four sides from a height of 8 feet. No additional damage was noted at the completion of the test.

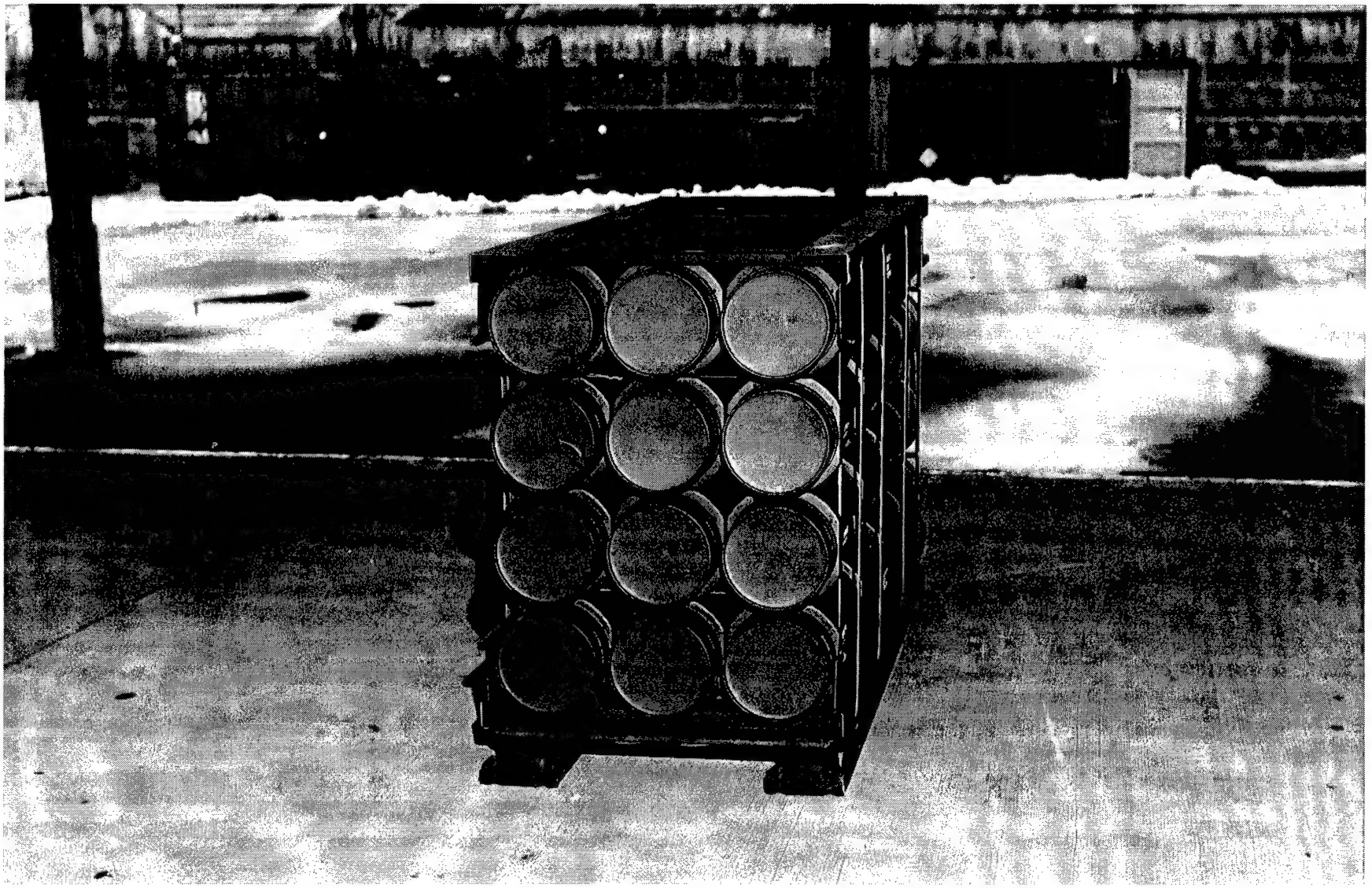
6. Post Test Inspection. Following completion of MIL-STD-1660 testing, the pallet was disassembled and inspected for additional damage. The cracks noted at the completion of the vibration test had not increased significantly. No significant damage was noted in the top or bottom adapters and only minor deformation was noted on the pallet deck.

PART 6

PHOTOGRAPHS



	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL	
PHOTO NO. A0317-SCN-97-1159. This photograph shows the side view of one of the three pallets submitted by Delfasco of Tennessee.		



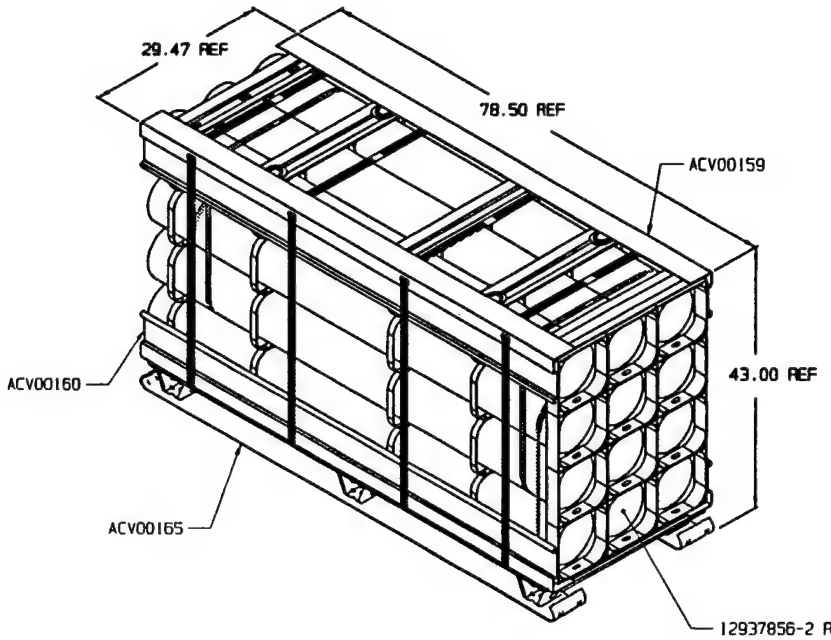
	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL	
PHOTO NO. A0317-SCN-97-1163. This photograph shows the end view of one of the three pallets submitted by Delfasco of Tennessee.		

PART 7

DRAWINGS

REVISION			
LTR	DESCRIPTION	DATE	APPROVED
-	PRODUCT BASELINE ERR M4R2001 94-03-25	94-03-25	SCHULTZ
A	NOR M5T3003 95-06-22 (ECP M6R3004) 96-02-22	96-04-11	

COMBINATION OF ADOPTED ITEMS	PART NO
PALLET - SPECIAL SIZE 78.50 X 29.31 SHEET METAL	ACV00165
TOP ASSEMBLY - PALLET ADAPTER PA150 CONTAINER	ACV00159
BOTTOM ASSEMBLY - PALLET ADAPTER PA150 CONTAINER	ACV00160
UNITIZATION DRAWING	19-48-4231/61-20PM1006



DISTRIBUTION STATEMENT A.

APPROVED FOR PUBLIC RELEASE;
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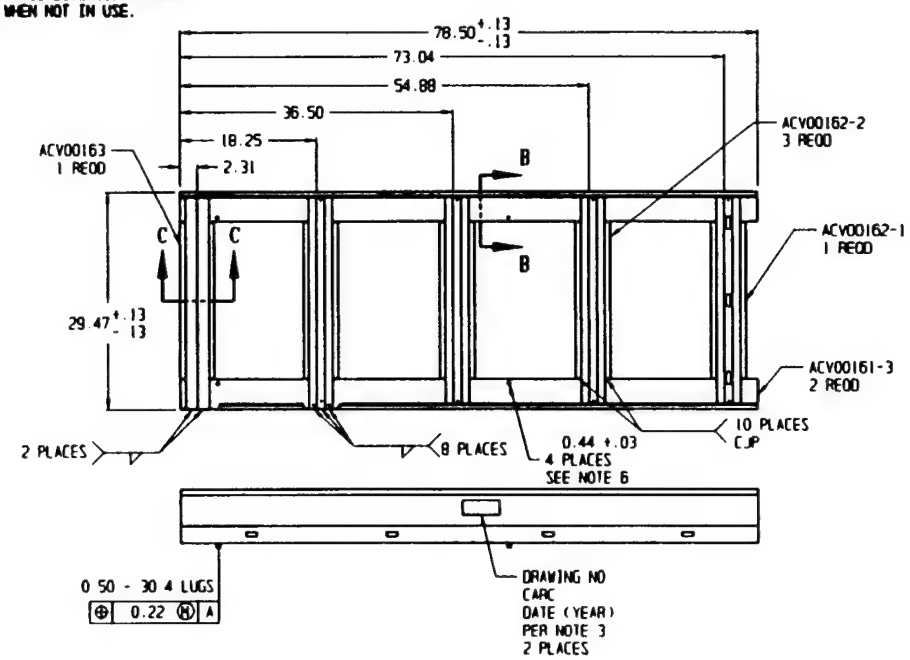
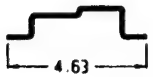
		UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES. BREAK SHARP CORNERS AND EDGES. TOLERANCES ON FRACTIONS ± DECIMALS ±	94-03-25	DESIGN ACTIVITY U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND DEFENSE AMMUNITION CENTER AND SCHOOL SAVANNA, ILLINOIS 61074-9639
			BJK SMS SCHULTZ	COMBINATION OF ADOPTED ITEMS, PALLET AND PALLET ADAPTER, UNITIZATION OF PA150 CONTAINER
	2.75 HYDRA ROCKET			SIZE D CAGE CODE 28620 ACV00156
NEXT ASSY	USED ON			SCALE 1/8 UNIT WT SHEET OF
APPLICATION				

NOTES:
1. MIL-A-2550, ANSI/AWS A2.4-86, ANSI Y14.5M-1982 AND MIL-A-70788 APPLY.
2. PROTECTIVE FINISH SHALL BE IN ACCORDANCE WITH DWG AC200000423. COLOR SHALL BE GREEN NO 383 PER MIL-C-46168 (FED STD 595 NO 34094).
3. MARKING PAINT SHALL BE IN ACCORDANCE WITH DWG AC200000423. COLOR SHALL BE WHITE NO 37875 0.50 INCH HIGH LETTERS.
4. WELDMENT CONSTRUCTION SPEC MIL-STD-1261, CLASS 1, APPLIES.
5. CHAMFERED CORNER SHALL NOT BE WELDED IN ORDER TO ALLOW ADDITIONAL DRAIN HOLE.
6. ALTERNATE ALIGNING LUG PART NO AC200000453-3 MAY BE USED INSTEAD OF PART NO AC200000453-1. IF ALTERNATE LUG IS USED, USE 0.52 4 PLACES.
7. DIMENSIONS OF THE RETAINER RING MAY BE VARIED TO INSURE THE RING'S POSITION WHEN LIFTED VERTICALLY SHALL BE BETWEEN 75 AND 85 DEGREES WITH THE HORIZONTAL. THIS DIMENSION ASSURES THAT THE RING SHALL BE SELF NESTING WHEN NOT IN USE.

REVISION			
LTR	DESCRIPTION	DATE	APPROVED
-	PRODUCT BASELINE ERR MAR2001 94-03-25	94-03-25	SCHULTZ
A	NOR MST3003 95-06-22 (ECP MSR3004) 96-02-22 (ECP MSR3006) 96-03-18	96-04-11	





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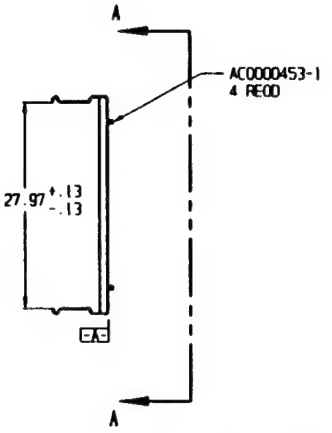


A	A
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

PART NO ACV00159

DISTRIBUTION STATEMENT A.

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.

	2.75 HYDRA
ACV00159	ROCKET
NEXT ASSY	USED ON
APPLICATION	

94-03-25

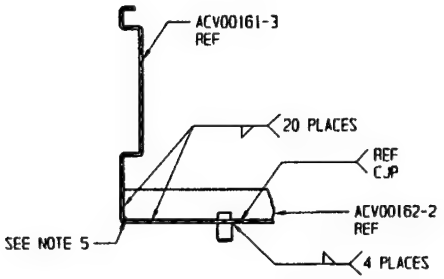
DRAWN	CHECKED	ENGINEER
BJK	SMS	SCHULTZ
APPROVED		
JS	JHK	T.J. NICHOLS
MANUFACTURING ENGINEER		
W.F. ERNST		
QUALITY ASSURANCE REPRESENTATIVE		
WILLIAM F. ERNST		

DESIGN ACTIVITY
U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND
ARMAMENT ENGINEERING AND TECHNOLOGY CENTER
LOVELACE, ILLINOIS 61074-5639

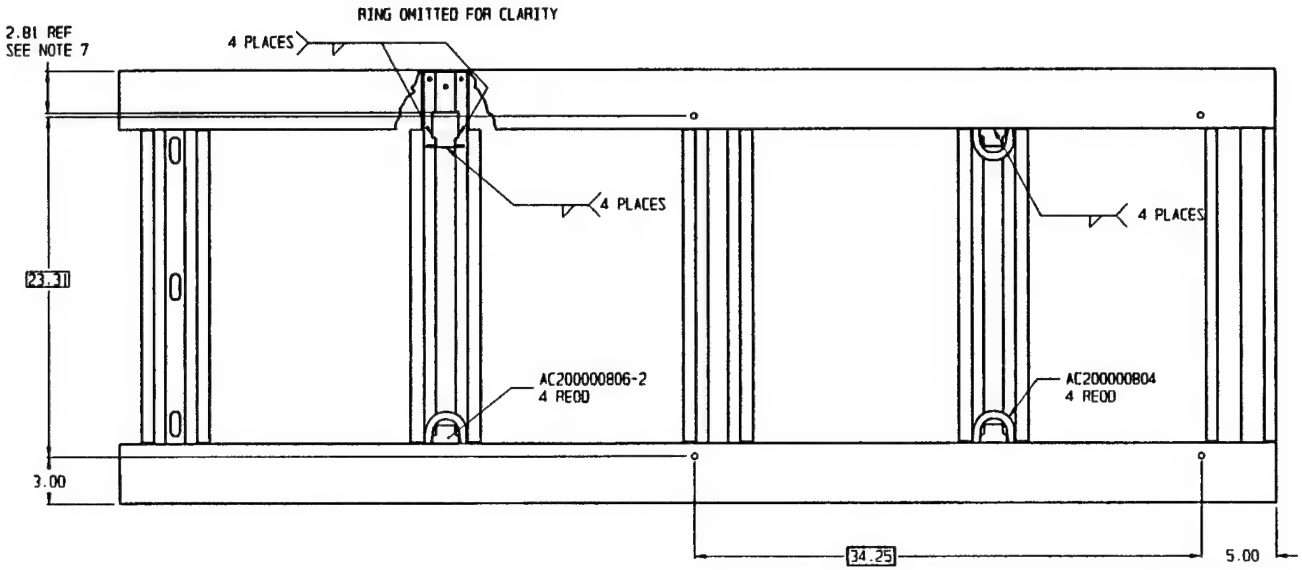
TOP ASSEMBLY-
PALLET ADAPTER
PAISO CONTAINER

SIZE	CAGE CODE	
B	28620	ACV00159
SCALE 1/8	UNIT WT	SHEET 1 OF 2

REVISION			
LTR	DESCRIPTION	DATE	APPROVED
-	PRODUCT BASELINE ERR M4R2001 94-03-25	94-03-25	SCHULTZ
A	NOR M5T3003 95-06-22 (ECP M6R3004) 96-02-22 (ECP M6R3006) 96-03-18	96-04-11	



SECTION B-B
SCALE 1/2



VIEW A-A

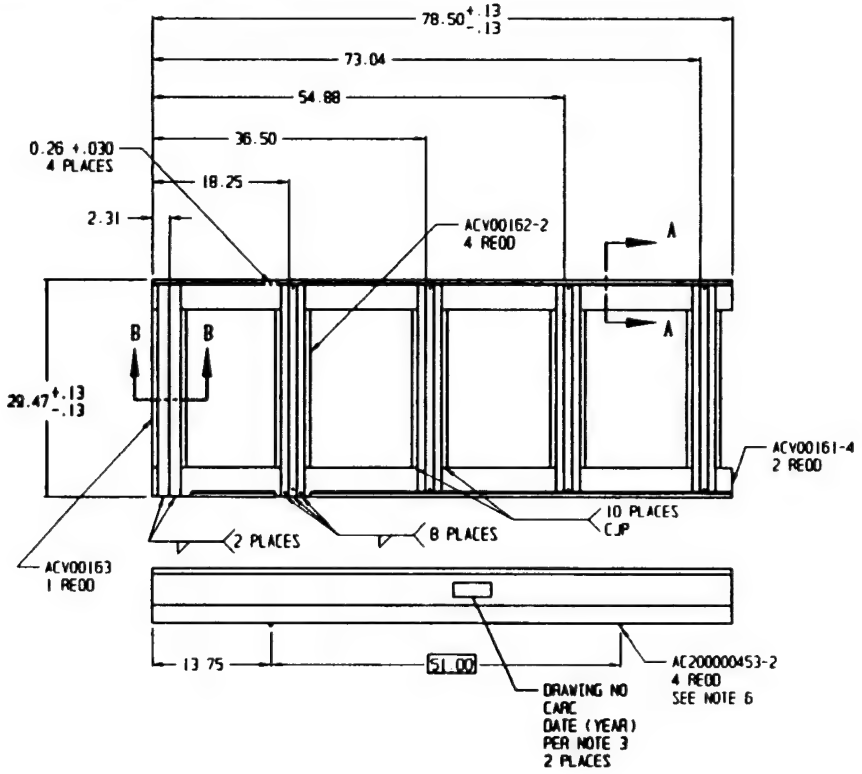
DISTRIBUTION STATEMENT A.

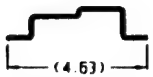
APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION IS UNLIMITED.

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES. BREAK SHARP CORNERS AND EDGES. TOLERANCES IN FRACTIONS ± DECIMALS ± .005 MATERIAL	DATE 94-03-25	DESIGN ACTIVITY U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND DEFENSE AMMUNITION CENTER AND SCHOOL SAVANNA, ILLINOIS 61074-9639	
	APPD BJK / CHKD SMS / RELEASED SCHULTZ		
	DRAWN JS / CHK JHK T.J. NICHOLS	TOP ASSEMBLY- PALLET ADAPTER PA150 CONTAINER	
	SUBSTITUTES W.F. ERNST		
APPLICATION	ENGINEER WILLIAM F. ERNST	SIZE D / CAGE CODE 28620	ACV00159
		SCALE 1/4 / UNIT WT	SHEET 2 OF 2

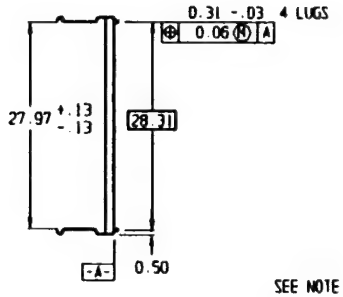
NOTES:
1. MIL-A-2550, ANSI/AWS A2.4-86, ANSI Y14.5M-1982 AND MIL-A-70788 APPLY.
2. PROTECTIVE FINISH SHALL BE IN ACCORDANCE WITH DWG AC200000423. COLOR SHALL BE GREEN NO 383 PER MIL-C-46168 (FED STD 595 NO 34094).
3. MARKING PAINT SHALL BE IN ACCORDANCE WITH DWG AC200000423. COLOR SHALL BE WHITE NO 37875 0.50 INCH HIGH LETTERS.
4. WELDMENT CONSTRUCTION SPEC MIL-STD-1261, CLASS 1, APPLIES.
5. CHAMFERED CORNER SHALL NOT BE WELDED IN ORDER TO ALLOW ADDITIONAL DRAIN HOLE.
6. ALTERNATE ALIGNING LUG DWG AC200000453-5 MAY BE USED INSTEAD OF DWG AC200000453-2. IF THE ALTERNATE LUG IS USED, USE 0.32 +.03 IN FOUR (4) PLACES.

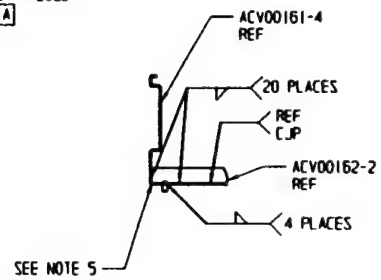
REVISION			
LTR	DESCRIPTION	DATE	APPROVED
-	PRODUCT BASELINE ERR M4R2001 94-03-25	94-03-25	SCHULTZ
A	NOR M5T3003 95-06-22 (ECP M6R3004) 96-02-22	96-04-11	





SECTION B-B
SCALE 1/2





SECTION A-A
SCALE 1/4

PART NO ACV00160

DISTRIBUTION STATEMENT A.

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DISTRIBUTION IS UNLIMITED.

		UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES. BREAK SHARP CORNERS AND EDGES. FRACTIONS ± DECIMALS .XXX ANGULAR	DATE 94-03-25 DRAWN BJK CHECKED SMS ENGR APPR SCHULTZ MFG APPR JS MGR APPR T.J. NICHELS DESIGNED W.F. ERNST DRAWN WILLIAM F. ERNST
	2.75 HYDRA		
ACV00158	POCKET		
NEXT ASSY	USED ON		
APPLICATION			

DESIGN ACTIVITY
U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND
OPERATIONS SUPPORT DIRECTORATE
SAVANNA, ILLINOIS 61074-9639

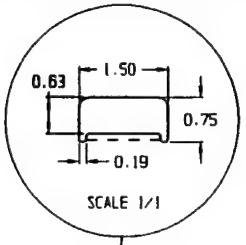
BOTTOM ASSEMBLY-
PALLET ADAPTER
PA150 CONTAINER

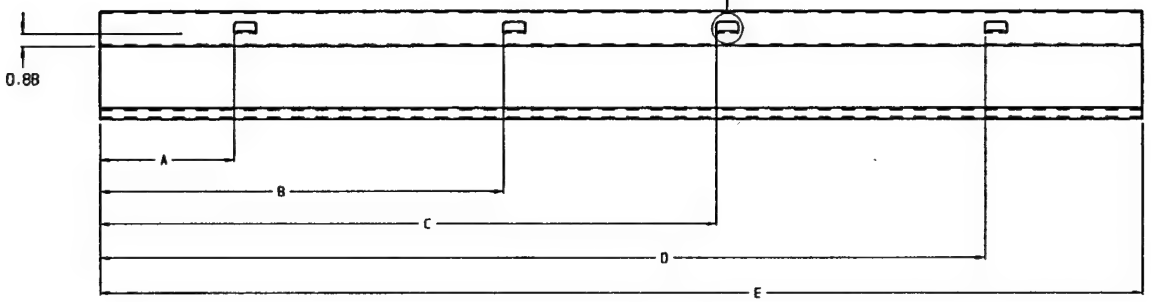
SIZE B | CAGE CODE 28620 | ACV00160

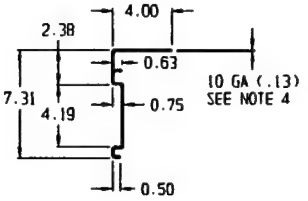
SCALE 1/8 | SHEET 01 | SHEET OF

NOTES:
1. BEND RADII 0.13 INCH MAX WHERE NOT NOTED.
2. ANSI Y14.5M-1982, MIL-A-2550 AND MIL-A-70788 APPLY.
3. MATERIAL: SHEET, SAE OR ANSI 1005-1010 STEEL, CARBON, COLD ROLL OR HOT ROLL, PER ASTM A568, (ASTM A366 OR A569).
4. PARTS ACV00161-2 AND ACV00161-4 MAY BE MADE OF 12 GA (.10) MATERIAL.

REVISION			
LTR	DESCRIPTION	DATE	APPROVED
-	PRODUCT BASELINE ERR MAR2001 94-03-25	94-03-25	SCHULTZ
A	NOR MST3003 95-06-22	96-04-11	







DIMENSION					
PART NO	A	B	C	D	E
ACV00161-1	9.75	24.75	44.50	59.50	70.75
ACV00161-2	---	---	---	---	70.75
ACV00161-3	9.00	27.08	49.92	68.00	78.50
ACV00161-4	---	---	---	---	78.50

SEE PARTS LIST

DISTRIBUTION STATEMENT A.

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION IS UNLIMITED.

ACV00157	
ACV00158	
ACV00159	2.75 HYDRA
ACV00160	ROCKET
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES. BREAK SHARP CORNERS AND EDGES.
FRACTIONS ±
DECIMALS .XX ±.02
ANGLES ±
MATERIAL

DATE 94-03-25
DRAWN BJK | CHECKED SMS | APPROVED SCHULTZ
SIZE/DEV JS | JHK T.J. NICHELS
SIGNATURE W.F. ERNST
ENGR/ARCH WILLIAM F. ERNST

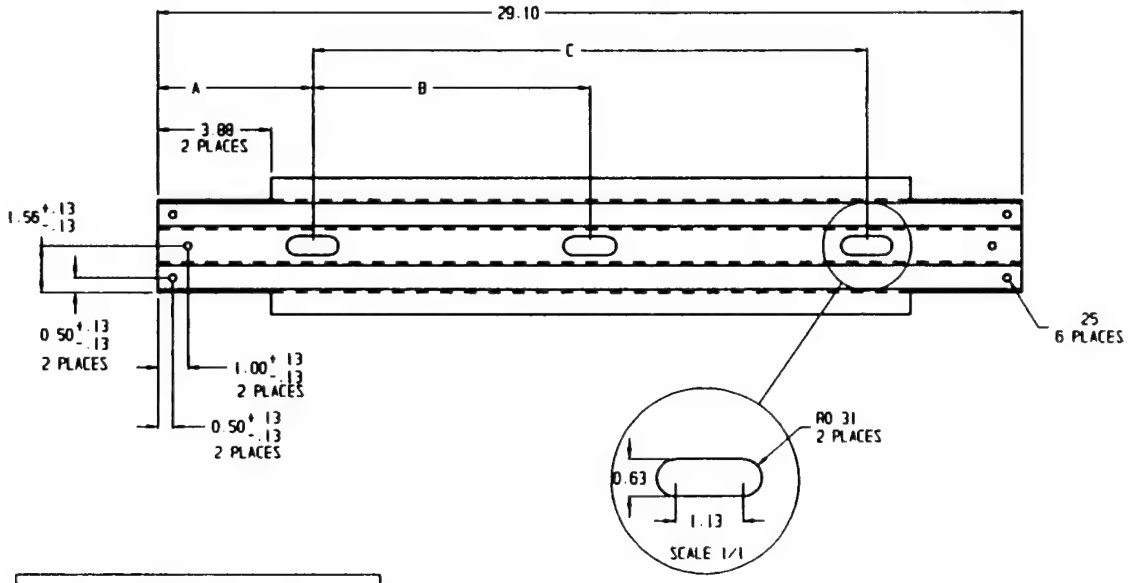
DESIGN ACTIVITY
U.S. ARMY
ARMAMENT, MUNITIONS AND CHEMICAL COMMAND
OPERATIONS MANAGEMENT DIRECTORATE
SAVANNA, ILLINOIS 61074-9639

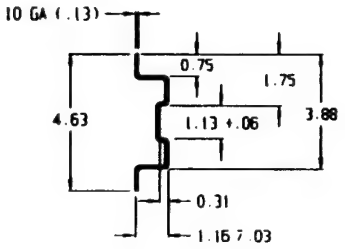
SIDE RAIL

SIZE B | CAGE CODE 28620 | ACV00161
SCALE 1/2 | UNIT WT | SHEET OF

NOTES:
1. BEND RADII 0.13 INCH MAX WHERE NOT NOTED.
2. ANSI Y14.5M-1982, MIL-A-2550 AND MIL-A-70788 APPLY.
3. MATERIAL: SHEET, SAE OR ANSI 1005-1010 STEEL, CARBON, COLD ROLL OR HOT ROLL, PER ASTM A568, (ASTM A366 OR A569).

REVISION			
LTR	DESCRIPTION	DATE	APPROVED
-	PRODUCT BASELINE		
	ERR MAR2001 94-03-25	94-03-25	SCHULTZ
A	NOR MST3003 95-06-22	96-04-11	
	(ECP MSR3004) 96-02-22		





DIMENSION			
PART NO	A	B	C
ACV00162-1	5.30	9.25	18.50
ACV00162-2	----	----	----

SEE PARTS LIST

DISTRIBUTION STATEMENT A.

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION IS UNLIMITED.

ACV00157	
ACV00158	
ACV00159	2.75 HYDRA
ACV00160	ROCKET
NEXT ASSY	USED ON
APPLICATION	

94-03-25

B.JK | SMS | SCHULTZ

JS | JHK | T.J. NICHELS

W.F. ERNST

WILLIAM F. ERNST

DESIGN ACTIVITY: U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND, SMALLCALIBER AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639

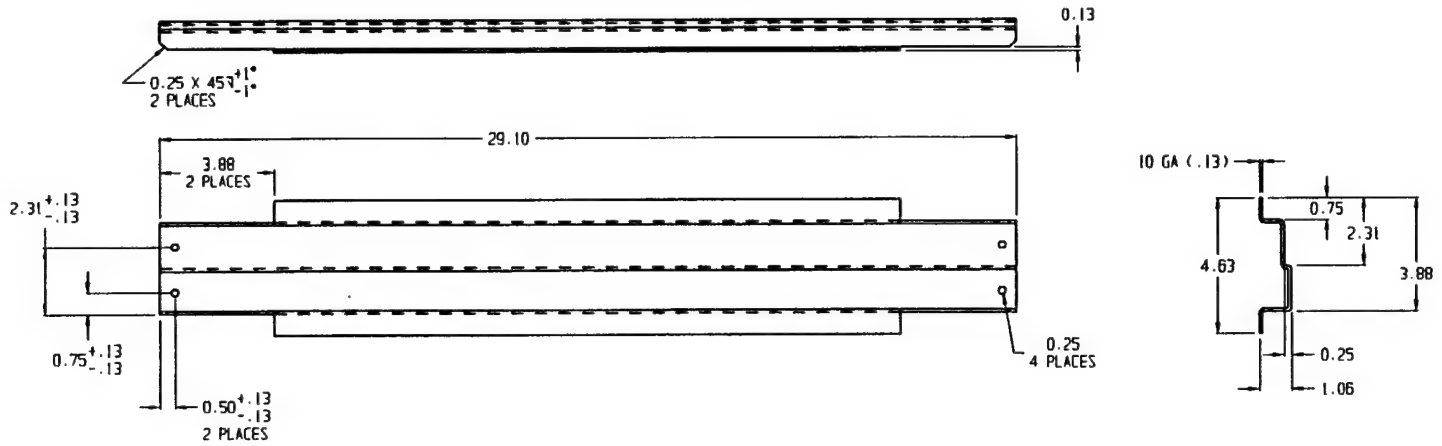
SQUARE RING RESTRAINT

SIZE: B | CAGE CODE: 28620 | ACV00162

SCALE: 2/1 | UNIT WT | SHEET | OF

NOTES:
1. BEND RADII 0.13 INCH MAX WHERE NOT NOTED.
2. ANSI Y14.5M-1982, MIL-A-2550 AND MIL-A 70700 APPLY.
3. MATERIAL: SHEET, SAE OR ANSI 1005-1010 STEEL, CARBON, COLD ROLL OR HOT ROLL, PER ASTM A568, (ASTM A366 OR A569).

REVISION				
LTR	DESCRIPTION		DATE	APPROVED
-	PRODUCT BASELINE ERR M4A2001	94-03-25	94-03-25	SCHULTZ
A	NOR M5T3003 (ECP M6R3004)	95-06-22 96-02-22	96-04-11	



PART NO ACV00163

DISTRIBUTION STATEMENT A.

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION IS UNLIMITED.

ACV00157	
ACV00158	
ACV00159	2.75 HYDRA
ACV00160	ROCKET
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES. BREAK SHARP CORNERS AND EDGES.
TOLERANCES ON
FRACTIONS
DECIMALS .XXX ±.005
ANGULAR

DATE 94-03-25
DRAWN BJK | DESIGN SMS | PART MGR SCHULTZ
DESIGNER JS | APVD JHK T.J. MICHELS
DIRECTOR W.F. ERNST
WILLIAM F. ERNST

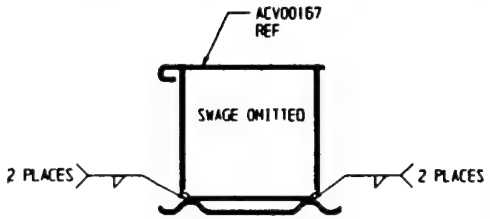
DESIGN ACTIVITY
U.S. ARMY
ARMAMENT, MUNITIONS AND CHEMICAL COMMAND
DEFENSE AMMUNITION CENTER AND SCHOOL
SAVANNA, ILLINOIS 61074-9639

SQUARE BELL RESTRAINT

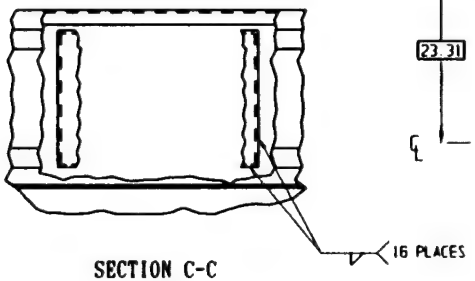
SIZE B | CAGE CODE 28620 | ACV00163
SCALE 1/2 | UNIT WT | SHEET | OF

NOTES:
1. MIL-A-2550, ANSI/AWS A2.4-86, ANSI Y14.5M-1982 AND MIL-P-70786 APPLY.
2. PROTECTIVE FINISH SHALL BE IN ACCORDANCE WITH DWG AC200000423. COLOR SHALL BE GREEN NO 383 PER MIL-C-46168 (FED STD 595 NO 34094).
3. MARKING PAINT SHALL BE IN ACCORDANCE WITH DWG AC200000423. COLOR SHALL BE WHITE NO 37875 0.50 INCH HIGH LETTERS.
4. WELDMENT CONSTRUCTION SPEC MIL-STD-1261, CLASS 1, APPLIES.
5. MAXIMUM GAP ALONG WELD LINE BETWEEN POST AND DECK OR POST AND SKID WILL NOT EXCEED 0.02 INCHES PRIOR TO WELDING. THIS MAY BE CHECKED WHEN RESTRAINED BY UP TO 1500 LBS UNIFORMLY APPLIED TO THE TOP SURFACE OF THE DECK.
6. THIS DIMENSION IS TO BE CHECKED AT THE INSPECTION POINTS (IP) DEFINED IN THE TOP VIEW. THE MEASUREMENTS WILL ORIGINATE FROM DATUMS A AND B.

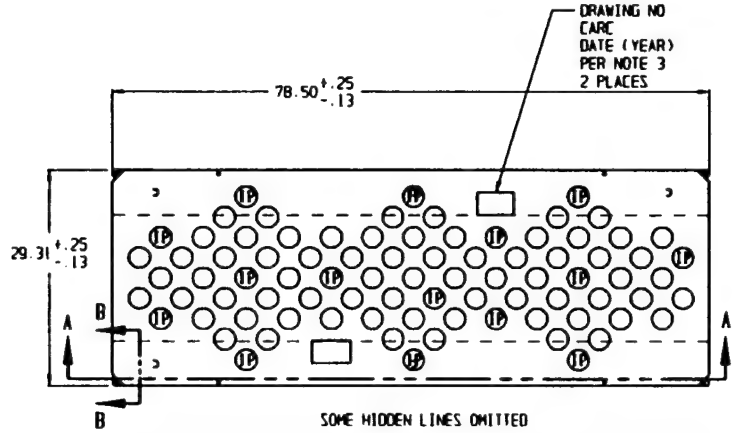
REVISION			
LTR	DESCRIPTION	DATE	APPROVED
-	PRODUCT BASELINE ERR MAR2001 94-03-25	94-03-25	SCHULTZ
A	NOR MST3003 95-06-22 (ECP MSR3004) 96-02-22	96-04-11	



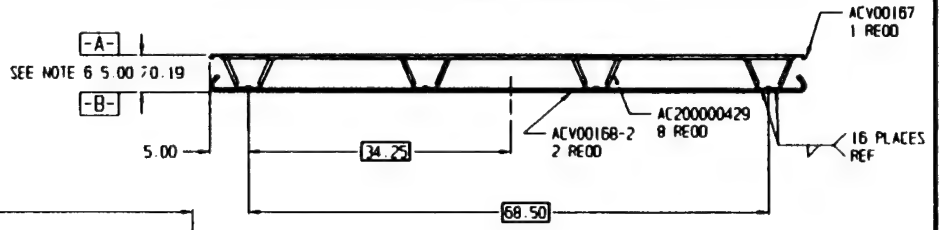
SECTION B-B
SCALE 1/2

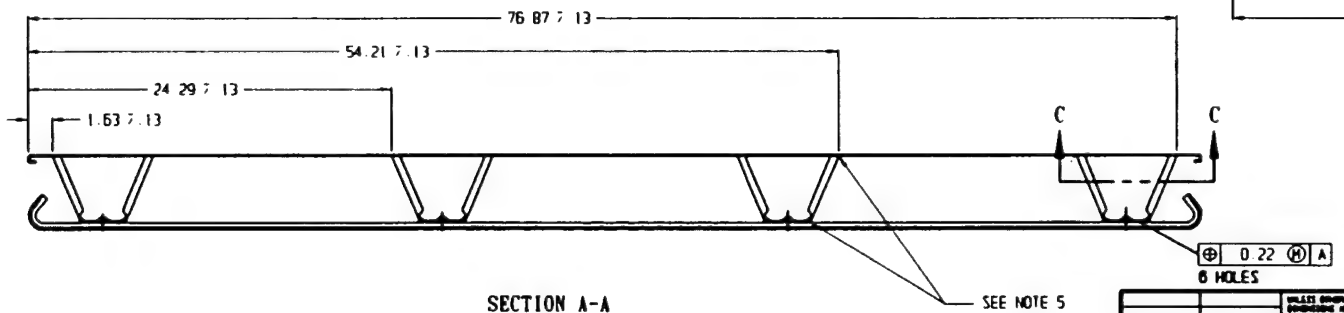


SECTION C-C
SCALE 1/2



SOME HIDDEN LINES OMITTED





SECTION A-A
SCALE 1/4

PART NO ACV00165

DISTRIBUTION STATEMENT A.

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION IS UNLIMITED.

ACV00156	2.75 HYDRA ROCKET
NEXT ASSY	USED ON
APPLICATION	

94-03-25
BJK | SMS | SCHULTZ
JS | JHK | T.J. MICHELS
W.F. ERNST
WILLIAM F. ERNST

DESIGN ACTIVITY: U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND, REDSTONE ARSENAL CENTER AND SCHOOL, ALABAMA, 35898-5000

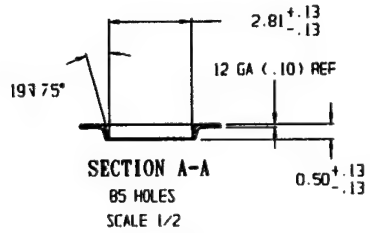
PALLET-SPECIAL SIZE
78.50 X 29.31,
SHEET METAL

SIZE B | CAGE CODE 28620 | ACV00165

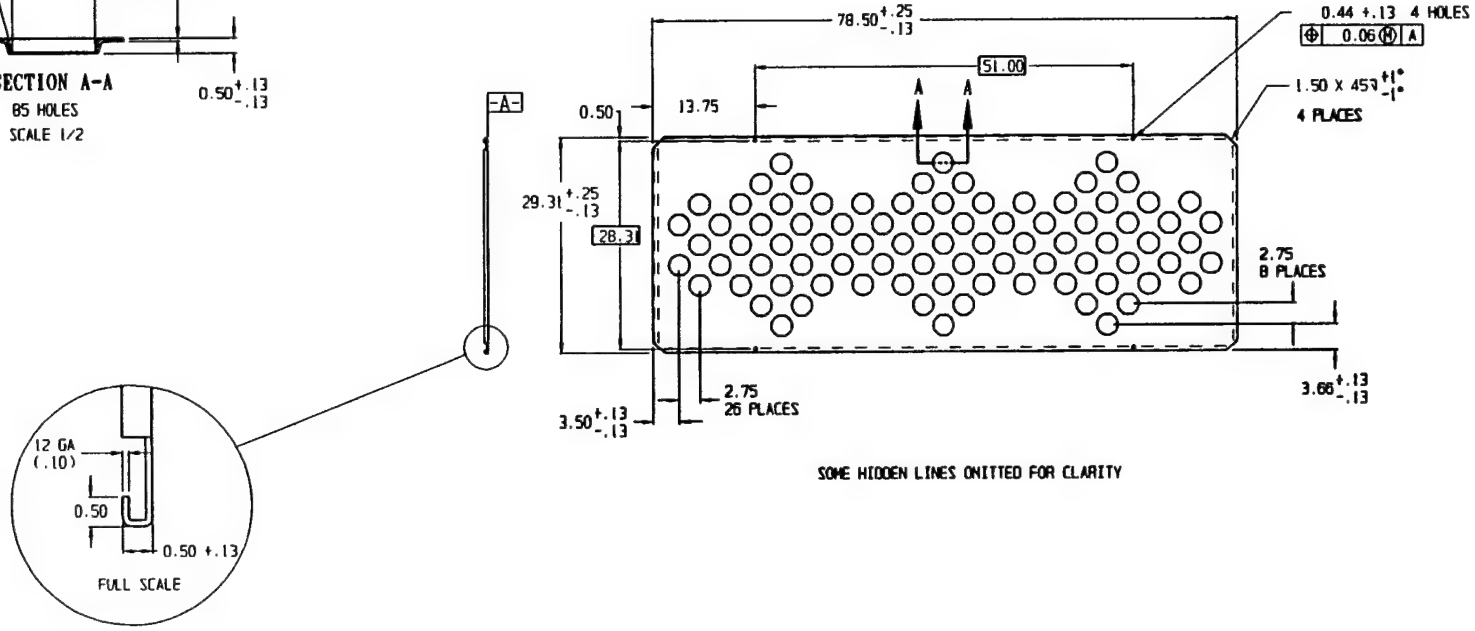
SCALE 1/8 | WEIGHT | SHEET 1 OF 1

REVISION				
LTR	DESCRIPTION		DATE	APPROVED
-	PRODUCT BASELINE ERR MAR2001	94-03-25	94-03-25	SCHULTZ
A	NOR MST3003	95-06-22	06-04-11	

NOTES:
1. BEND RADII 0.13 INCH MAX WHERE NOT NOTED.
2. ANSI Y14.5M-1982, MIL-A-2550 AND MIL-P-70786 APPLY.
3. MATERIAL: SHEET, SAE OR ANSI 1005-1010 STEEL, CARBON, COLD ROLL OR HOT ROLL, PER ASTM A568, (ASTM A366 OR A569).



SECTION A-A
85 HOLES
SCALE 1/2



FULL SCALE

SOME HIDDEN LINES ONITTED FOR CLARITY

PART NO ACV00167

DISTRIBUTION STATEMENT A.

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION IS UNLIMITED.

ACV00165	2.75 HYDRA ROCKET
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE NOTED DIMENSIONS ARE OR INCHES. BREAK SHARP CORNERS AND EDGES.
TOLERANCES ON
FRACTIONS
DECIMALS 1.002
MATERIAL

DATE 94-03-25
DRAWN BJK | CHECKED SMS | APPROVED SCHULTZ
DESIGNED JS | LHK T.J. NICHELS
QUALITY
MANUFACTURING W.F. ERNST
ENGINEERING APPROVAL WILLIAM F. ERNST

DESIGN ACTIVITY U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND DEFENSE AMMUNITION CENTER AND SCHOOL SAVANNA, ILLINOIS 61074-9639

DECK-PALLET SPECIAL
SIZE 78.50 X 29.31,
SHEET METAL

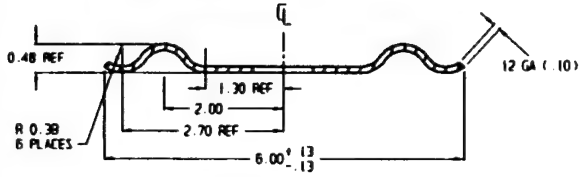
SIZE	CAGE CODE	ACV00167
B	28620	

SCALE 1/8 | UNIT WT | SHEET | OF

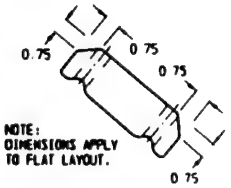
NOTES:
1. ANSI Y14.5M-1982, MIL-A-2550 AND MIL-P-70700 APPLY.
2. MATERIAL: SHEET, SAE OR ANSI 1005-1010 STEEL, CARBON, COLD ROLL OR HOT ROLL, PER ASTM A568 (ASTM A366 OR A569).
3. DISTORTION IN THE BEND IS PERMISSIBLE.

REVISION				
LTR	DESCRIPTION		DATE	APPROVED
-	PRODUCT BASELINE			
	ERR MAR2001	94-03-25	94-03-25	SCHULTZ
A	NOR MST3003	95-06-22	95-04-11	

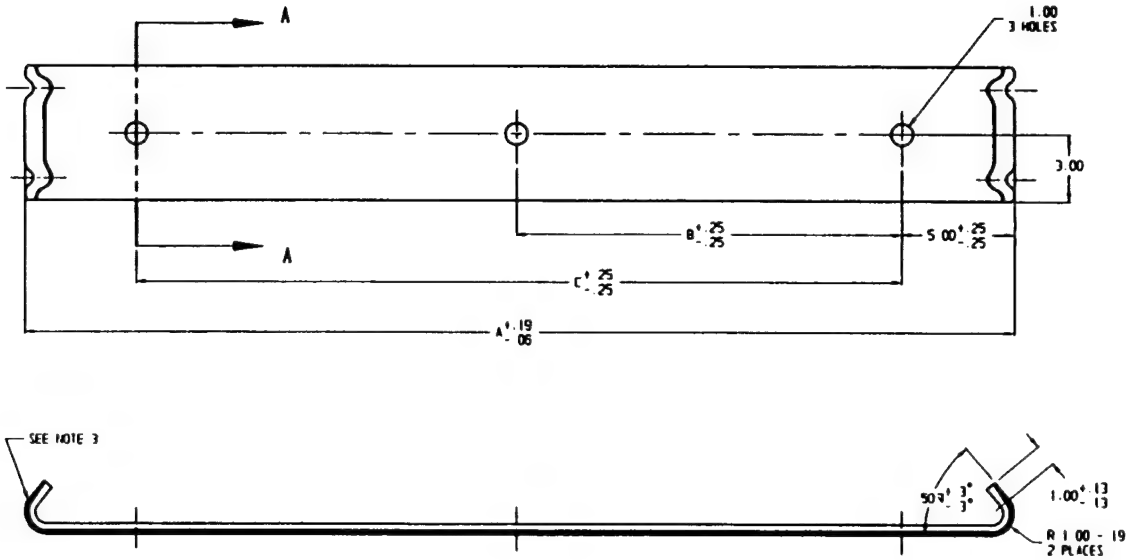
NOTE:
DIMENSIONS APPLY FROM CENTERLINE OF HOLE.



SECTION A-A
SCALE 1/1



NOTE:
DIMENSIONS APPLY TO FLAT LAYOUT.



HIDDEN LINES OMITTED FOR CLARITY

DIMENSION			
PART NO	A	B	C
ACV00168-1	70.75	30.38	60.75
ACV00168-2	78.50	34.25	68.50

DISTRIBUTION STATEMENT A.

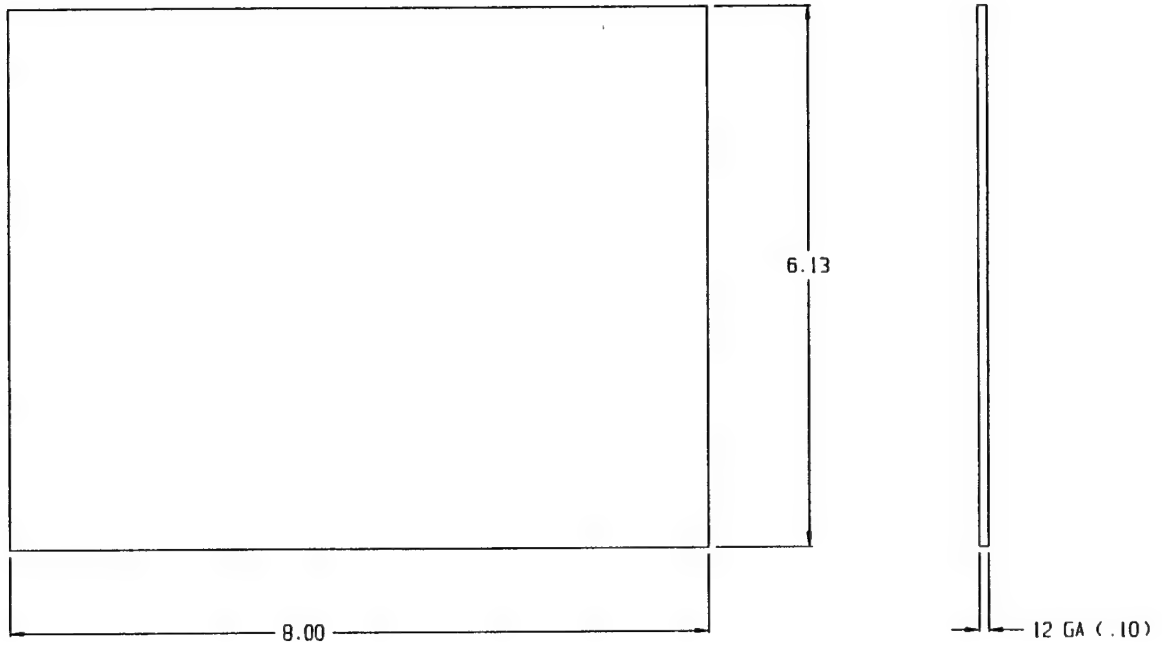
APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION IS UNLIMITED.

PART NO ACV00168

ACV00165	2.75 HYDRA	94-03-25	DESIGN ACTIVITY U.S. ARMY ...
ACV00164	ROCKET	BJK / SMS / SCHULTZ	
NEXT ASSY	USED ON	JS / JHK / T.J. NICHELS	SKID-PALLET SHEET METAL
APPLICATION		W.F. ERNST	
		WILLIAM F. ERNST	SIZE D / CAGE CODE 28620 / ACV00168
		SCALE 3/8	WEIGHT / SHEET 1 OF 1

REVISION			
LTR	DESCRIPTION	DATE	APPROVED
-	PRODUCT BASELINE EAR e#e#### YY-MM-DD	YY-MM-DD	

NOTES:
1. ANSI Y14.5M-1982, MIL-A-2550 AND MIL-P-70786 APPLY.
2. MATERIAL: SHEET, SAE OR ANSI 1005-1010 STEEL, CARBON, COLD ROLL OR HOT ROLL, PER ASTM A568, (ASTM A366 OR A569).



PART NO ACV00307

DISTRIBUTION STATEMENT A.

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION IS UNLIMITED.

ACV00165	2.75 HYDRA
ACV00164	ROCKET
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES. BREAK SHARP CORNERS AND EDGES.
TOLERANCES ON
FRACTIONS ±
DECIMALS ±.13

MATERIAL

DATE 96-06-05

DRAWN	CHECKER	PROJ ENGR
BJK	TJM	MICHELS

SIGAC-DEV
CHIEF, SUPPLY ENGINEERING DIV

SUBMITTED
CHIEF, LOGISTICS ENGINEERING OFFICE

APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND (AMC)

U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL

DESIGN ACTIVITY
U.S. ARMY
INDUSTRIAL OPERATIONS COMMAND
DEFENSE AMMUNITION CENTER AND SCHOOL
SAVANNA, ILLINOIS 61074-9639

POST SUPPORT PLATE

SIZE	CAGE CODE	
C	28620	ACV00307

SCALE 1/1 | UNIT WT | SHEET 1 OF 1

REVISION			
LTR	DESCRIPTION	DATE	APPROVED
A	CHANGE PAINT THICKNESS REQUIREMENTS	87-09-17	ERNST
B	PRODUCT BASELINE ERR M8K9450 NOR M2T4200 92-07-20	89-04-10	TT
C	(ECP M3T4030 93-11-02)		SCHULTZ
	(ECP M4T3005 94-06-02)	94-11-02	
D	NOR M5T8003 95-05-09	95-06-07	SCHULTZ
E	NOR M5T3003 95-06-22 (ECP M6A3004) 96-02-22	96-04-11	

1. DETAIL REQUIREMENTS FOR SURFACE PREPARATION (CLEANING AND PRETREATMENT) TO BARE METAL PRIOR TO PRIMING AND PAINTING.

   1.1 ALL SURFACES SHALL BE THOROUGHLY CLEANED SUCH THAT THE BARE METAL SURFACES ARE FREE FROM OIL, GREASE, DIRT, SCALE, RUST, FOREIGN MATTER AND LOOSE WELD SPATTER. THE CLEANING METHOD SHALL BE IN ACCORDANCE WITH ANY METHOD IN TABLE IV OF MIL-STD-171 OR AS SPECIFIED IN PARAGRAPH 3.1 OF MIL-T-704. PARTICULAR CARE MUST BE TAKEN TO REMOVE WELD SLAG AND LOOSE WELD SPATTER FROM WELDS AND ADJACENT AREAS.

   1.2 IMMEDIATELY AFTER CLEANING, ANY SOLVENTS OR MOISTURE SHALL BE COMPLETELY REMOVED. THESE CLEAN DRY SURFACES SHALL THEN HAVE A PRETREATMENT APPLIED IN ACCORDANCE WITH MIL-STD-171. FOR STEEL SUBSTRATES THE PRETREATMENT TO USE IS ZINC PHOSPHATE, FINISH NO. 5.1.1, IRON PHOSPHATE, FINISH NO. 5.1.2 OR WASH PRIMER, FINISH NO. 5.2.

   1.3 IMMEDIATELY PRIOR TO PRIMING, ALL SURFACES WHICH HAVE BEEN CLEANED AND PRETREATED IN ACCORDANCE WITH PARAGRAPH 1.1 AND 1.2 SHALL BE CHECKED FOR THOROUGH CLEANLINESS. ANY ACCUMULATION OF OIL, GREASE, DUST, RESIDUES FROM THE CLEANING PROCESS OR ANY FOREIGN MATERIAL SHALL BE COMPLETELY REMOVED. THE USE OF SOLVENTS MEETING THE REQUIREMENTS OF TABLE IV, FINISH NO. 4.3 OF MIL-STD-171 IS ACCEPTABLE. THE COMPLETE DRYING OF ANY SOLVENTS OR MOISTURE IS ESSENTIAL.

2. DETAIL REQUIREMENTS FOR APPLICATION OF ANTI-CORROSIVE PRIMER PAINT.

   2.1 PRIMER SHALL BE APPLIED ON ALL SURFACES IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTIONS AND PARAGRAPHS 5.2.1 AND 5.2.2 OF MIL-STD-171 (EXCEPT THAT WHEN ACCELERATED DRYING IS EMPLOYED, OVEN TEMPERATURE IS NOT TO EXCEED 200 DEGREES F). MIL-P-53022 OR MIL-P-53030 MAY BE USED ON EITHER FERROUS OR NON-FERROUS MATERIALS.

   2.2 ONE COAT OF PRIMER SHALL BE APPLIED AS PROMPTLY AS POSSIBLE AFTER THE SURFACES HAVE BEEN PREPARED AND CLEANED BY THE AFOREMENTIONED PROCEDURES. THE PRIMER SHALL BE DRY TO THE TOUCH IN ACCORDANCE WITH MIL-C-53072. ALL EPOXY PRIMERS SHALL BE PROPERLY CURED BEFORE TOPCOATING. PRIMER DRY FILM THICKNESS SHALL BE APPLIED TO ATTAIN THE 336 HOUR SALT SPRAY REQUIREMENT. RECOMMENDED THICKNESS RANGE IS .0010 TO .0035 INCHES (.0254 TO .0889 MM).

3. DETAIL REQUIREMENTS FOR APPLICATION OF POLYURETHANE TOPCOAT PAINT.

   3.1 TOPCOAT SHALL BE APPLIED ON EXTERIOR SURFACES ONLY IN ACCORDANCE WITH MANUFACTURERS' INSTRUCTIONS OR PARAGRAPHS 5.2.1 AND 5.2.2 OF MIL-STD-171. UNLESS OTHERWISE SPECIFIED, THE TOPCOAT COLOR SHALL BE GREEN NO. 383 IN ACCORDANCE WITH MIL-C-46168 OR MIL-C-53039.

   3.2 TOPCOAT DRY FILM THICKNESS OF MIL-C-46168 AND MIL-C-53039 SHALL BE .0018 TO .0035 INCHES, (.0457 TO .0889 MM) TOTAL APPLIED IN TWO COATS, THE SECOND COAT MAY BE APPLIED IN ACCORDANCE WITH MIL-C-53072 OR MANUFACTURERS RECOMMENDATIONS.

   3.3 ALL REWORK SHALL BE IN ACCORDANCE WITH PARAGRAPH 3.6.1 OF MIL-C-53072.

   3.4 ALTERNATE COATINGS MAY BE USED IF APPROVED BY THE CONTRACTING OFFICER.

4. DETAIL REQUIREMENTS FOR APPLICATION TO PREVIOUSLY PAINTED SUBSTRATES.

   4.1 ALL PREVIOUSLY PAINTED SURFACES MUST BE CLEAN AND FREE FROM RUST. WHERE RUST EXISTS, MECHANICAL CLEANING IN ACCORDANCE WITH FINISH NO. 4.1 OF MIL-STD-171 (WIREBRUSH IS ACCEPTABLE) SHALL BE PERFORMED UNTIL BRIGHT METAL IS EXPOSED. ONE COAT OF POLYURETHANE PAINT PER MIL-C-46168 OR MIL-C-53039 CAN BE APPLIED DIRECTLY OVER EXISTING ENAMEL OR POLYURETHANE COATINGS WITHOUT ANY ADDITIONAL SURFACE PREPARATION EXCEPT CLEANING. IF THE SURFACE IS BROKEN DOWN TO THE SUBSTRATE, THAT AREA MUST BE CLEANED, PRETREATED, PRIMED AND TOPCOATED PER PARAGRAPH 1 THROUGH 3. THE POLYURETHANE COATING SHALL NOT HOWEVER, BE DIRECTLY APPLIED OVER LACQUER. THE LACQUER MUST BE REMOVED DOWN TO THE BARE METAL BEFORE POLYURETHANE COATING IS APPLIED PER PARAGRAPHS 1 THROUGH 3.

   4.2 WHERE VENDOR PARTS ARE SUPPLIED TO THE PRIME ORIGINAL EQUIPMENT MANUFACTURER (OEM) ALREADY ENAMEL PAINTED, THE PRIME OEM WILL HAVE TO REPAINT PER PARAGRAPH 4.1 BY APPLYING DIRECTLY OVER THE EXISTING ENAMEL COATING. IF THE VENDOR PARTS ARRIVE JUST ENAMEL PRIMED (WHICH IS PREFERABLE), WITH SPECIFICATION PRIMERS SUCH AS TT-P-1757 OR TT-P-664, THEN THE POLYURETHANE PAINT PER PARAGRAPH 4.1 WILL BE APPLIED DIRECTLY OVER PRIMED SURFACES. IF THE ENAMELS ON THE VENDOR PARTS ARE OF A COMMERCIAL OR UNKNOWN TYPE THEY MUST BE TESTED BEFORE THE POLYURETHANE CAN BE APPLIED. THIS ENTAILS APPLYING POLYURETHANE PAINT TO A SMALL AREA OF THE PART AND OBSERVING FOR A PERIOD OF 15 MINUTES FOR ANY DEFECTS SUCH AS BLISTERING, DELAMINATION OR BLEEDING. IF NONE ARE OBSERVED, THE REMAINDER OF THE PARTS CAN BE PAINTED. IF THERE IS A DEFECT, THE PARTS MUST BE CLEANED, PRETREATED, PRIMED AND TOPCOATED AS PREVIOUSLY DESCRIBED FOR BARE SUBSTRATES IN PARAGRAPH 1 THROUGH 3.

5. TESTING.

   5.1 PALLETS AND/OR ADAPTERS FINISHED IN ACCORDANCE WITH PARAGRAPH 2.3, AND 4 AS APPLICABLE SHALL BE TESTED FOR PAINT ADHESION USING ACTUAL PRODUCTION ITEMS.

   5.2 THE PRIMER AND TOPCOAT SHALL BE ADHESION TESTED IN ACCORDANCE WITH PARAGRAPH 4.2.7.2 OF TT-C-490.

   5.3 THE PRIMER AND TOPCOAT SHALL BE TESTED IAW PARAGRAPH 4.2.8 OF TT-C-490.

   5.4 MIL-C-53072, PARAGRAPH 4.3.3.7 APPLIES.

DISTRIBUTION STATEMENT A.

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION IS UNLIMITED.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES. BREAK SHARP CORNERS AND EDGES.
TOLERANCES ON
FRACTIONS ±
DECIMALS ±
ANGLES ±
MATERIAL

DATE 86-05-09

OPTION	CHECKED	PROJ ENGR
DH	KD	ZAJICEK

SPEC-DEV T. J. MICHELS
CHIEF, SUPPLY ENGINEERING DIV

SUBMITTED W. F. ERNST
CHIEF, LOGISTICS ENGINEERING OFFICE

APPROVED BY ORDER OF COMMANDER
JOHN L. BYRD, JR.
U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL

DESIGN ACTIVITY
U.S. ARMY
ARMAMENT, MUNITIONS AND CHEMICAL COMMAND
DEFENSE AMMUNITION CENTER AND SCHOOL
SAVANNA, ILLINOIS 61074-9639

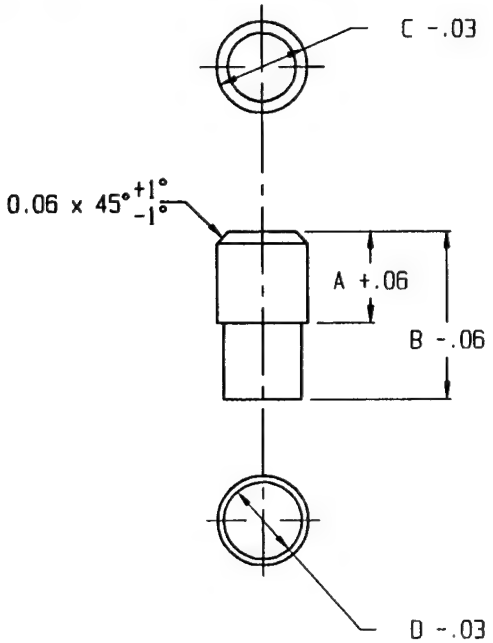
CHEMICAL AGENT RESISTANT COATING (CARC) FINISHING REQUIREMENTS FOR METAL PALLETS AND/OR PALLET ADAPTERS

SIZE	CAGE CODE	
C	28620	AC200000423

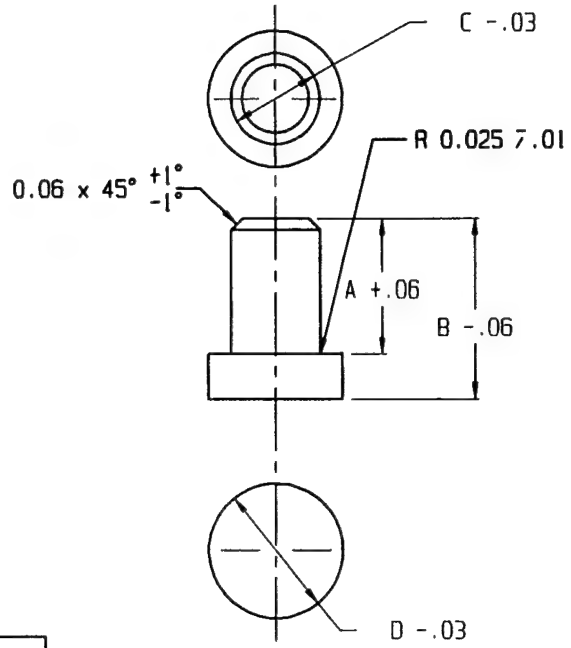
SCALE NONE | UNIT WT | SHEET 1 OF 1

NOTES:
1. ANSI Y14.5M-82 APPLIES.
2. MATERIAL: STEEL, 1018 OR 1020, PER ASTM A36.

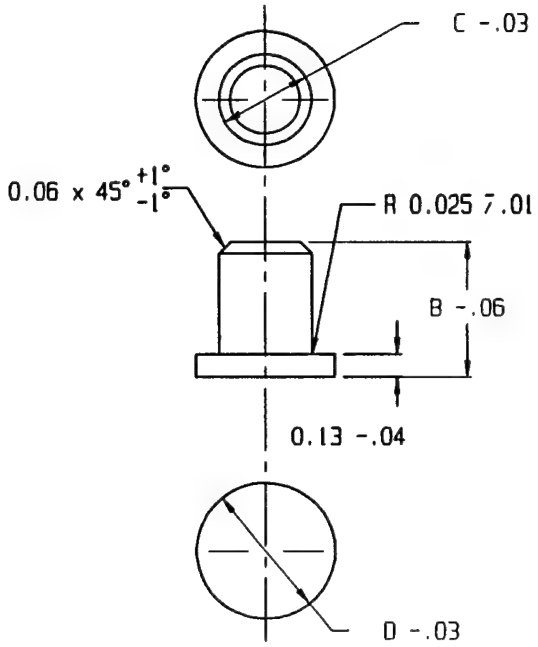
REVISION			
LTR	DESCRIPTION	DATE	APPROVED
-	PRODUCT BASELINE ERR M8K9450	89-04-10	TPT
A	NOR M9T3051 89-04-26	89-06-23	FRIEND
B	ECP M9T3082-009 89-08-16	90-09-24	DREIER
C	ECP M0A2201-001 90-10-19	90-12-07	SCHULTZ
D	NOR M2T4200 92-07-20 (ECP M4T3005 94-06-02)	94-11-02	SCHULTZ
E	NOR M5T3003 95-06-22	96-04-11	



PART NO AC200000453-1
PART NO AC200000453-2
PART NO AC200000453-5



PART NO AC200000453-3



PART NO AC200000453-4

DIMENSION				
PART NO	A	B	C	D
AC200000453-1	.63	1.00	.50	.43
AC200000453-2	.50	.75	.31	.25
AC200000453-3	.75	1.00	.50	.75
AC200000453-4	N/A	.75	.31	.56
AC200000453-5	.63	.69	.37	.31

DISTRIBUTION STATEMENT A.

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION IS UNLIMITED.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES. BREAK SHARP CORNERS AND EDGES.
TOLERANCES ON
FRACTIONS
DECIMALS ±.03
MATERIAL

DATE 87-06-05
DFTSMN JG | CHECKER MJJ | PROJ ENGR DREIER
SMCAC-DEV WM | JK | T.J. MICHELS, CHIEF, SUPPLY ENGINEERING DIV
SUBMITTED W. F. ERNST, CHIEF, LOGISTICS ENGINEERING OFFICE
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND (AMC)
JOHN L. BYRD, JR.
U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL

DESIGN ACTIVITY
U.S. ARMY
ARMAMENT, MUNITIONS AND CHEMICAL COMMAND
DEFENSE AMMUNITION CENTER AND SCHOOL
SAVANNA, ILLINOIS 61074-9639

LUG- ALIGNING METAL PALLET

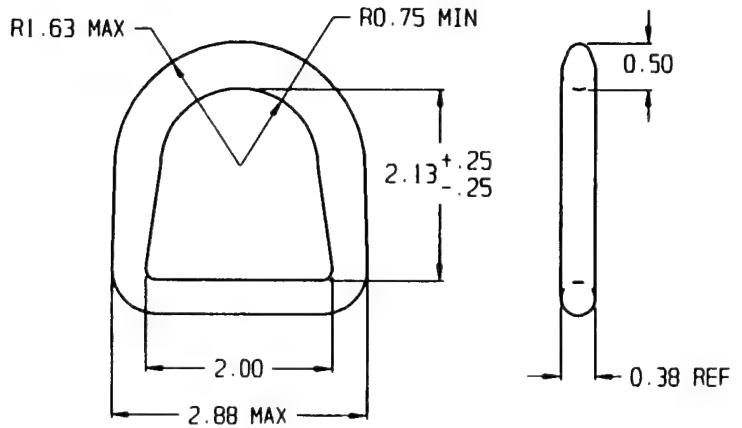
SIZE	CAGE CODE	
C	28620	AC200000453

SCALE 2/1 | UNIT WT | SHEET 1 OF 1

NOTES:
1. FRAME: 'D'-RING, 0.38 STOCK DIA, 4140 STEEL, 5,000# SAFE WORKING LOAD, ULTIMATE STRENGTH 13,000# OR GREATER.
2. PLATING: IMMERSION ZINC FLAKE/CHROMATE DISPERSION MIL-C-87115.
3. DIMENSIONS SHOWN ARE ENVELOPE DIMENSIONS NECESSARY FOR THE RING TO MATE WITH THE RING RETAINER AND TO PERFORM ITS INTENDED FUNCTION.
4. IDENTIFICATION OF THE SUGGESTED SOURCE(S) HEREON IS NOT TO BE CONSTRUED AS A GUARANTEE OF PRESENT OR CONTINUED AVAILABILITY AS A SOURCE OF SUPPLY FOR THE ITEM(S).

REVISION			
LTR	DESCRIPTION	DATE	APPROVED
-	PRODUCT BASELINE ERR M9T3051	89-06-23	FRIEND
A	ECP M9T3082-005 89-08-16	90-09-24	DREIER
B	ECP M9T3087-005 89-09-19	90-09-28	SCHULTZ
C	NOR M2T4200 92-07-20 (ECP M0T4200 90-12-11) (ECP M4T3005 94-06-02)	94-11-02	SCHULTZ
D	NOR M5T3003 95-06-22	96-04-11	

SUGGESTED SOURCES OF SUPPLY		
SUPPLIER DATA		
CAGE	PART NUMBER	NAME AND ADDRESS
16007	1070	U.S FORGECRAFT CORP. P.O. BOX 387 FT. SMITH, AR 72902
6V480	204-115	HELGESEN INDUSTRIES, INC. 7261 HIGHWAY 60 WEST HARTFORD, WI 53027



SPECIFICATION CONTROL DRAWING

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES. BREAK SHARP CORNERS AND EDGES.
TOLERANCES IN
FRACTIONS
DECIMALS ± .13
MATERIAL

DATE 89-03-10

ORIGINATOR	CHECKER	PROJ ENGR
JG	MJJ	DREIER

SPEC-ENGR	
WM JK	T.J. MICHELS

SUBMITTED W. F. ERNST

APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND (AMC)
JOHN L. BYRD JR.

DESIGN ACTIVITY
U.S. ARMY
ARMAMENT, MUNITIONS AND CHEMICAL COMMAND
DEFENSE AMMUNITION CENTER AND SCHOOL
SAVANNA, ILLINOIS 61074-9639

LIFTING RING

SIZE	CAGE CODE	
C	28620	AC200000804

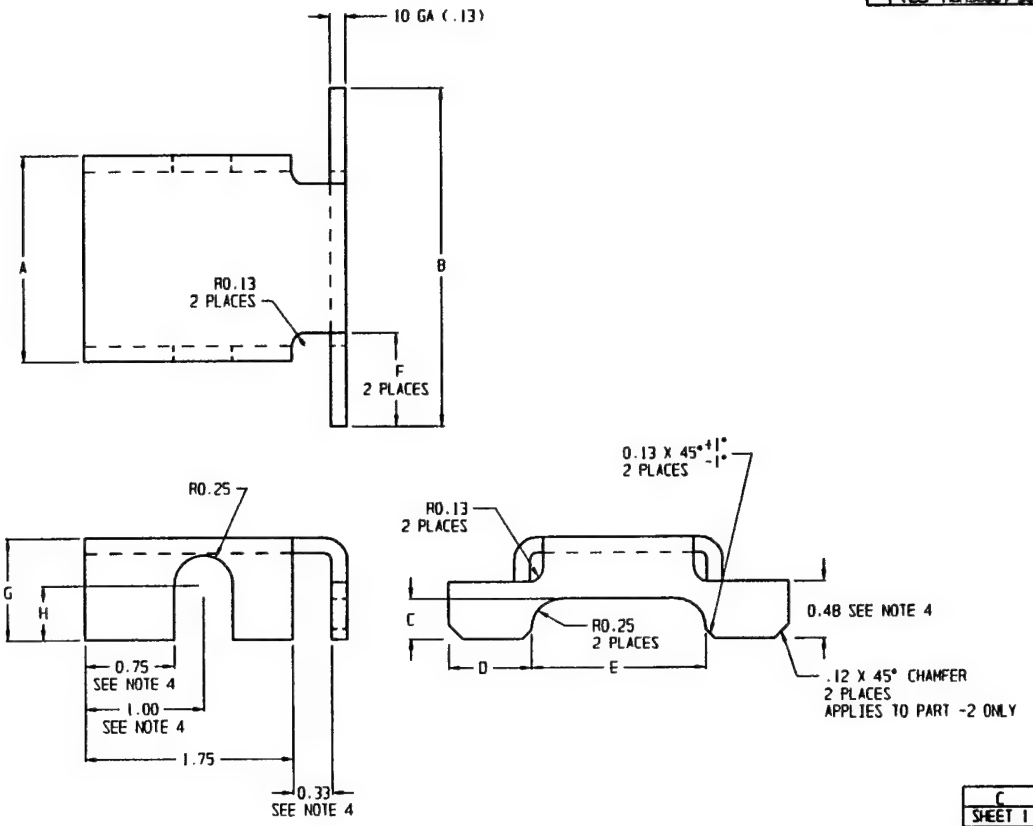
SCALE 1/1 | UNIT WT | SHEET 1 OF 1

DISTRIBUTION STATEMENT A.

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION IS UNLIMITED.

NOTES:
1. BEND RADII 0.06 INCH MAX WHERE NOT NOTED.
2. ANSI Y14.5M-1982 APPLIES.
3. MATERIAL: SHEET, SAE OR ANSI 1005-1010 STEEL, CARBON, COLD ROLL OR HOT ROLL, PER ASTM A568, (ASTM A366 OR A569).
4. THESE DIMENSIONS MAY BE VARIED TO ACHIEVE THE ASSEMBLY OBJECTIVE DETAILED ON SHEET 2.
5. DIMENSION SHOWN IS TO ACHIEVE A RING POSITION AT REST WHICH IS BELOW THE TOP SURFACE OF THE PALLET, BUT ELEVATED TO READILY ACCEPT THE SLING HOOK.
6. THIS DIMENSION IS TO BE ACHIEVED WHEN MATED WITH SIDE RAIL AND SQUARE RING RESTRAINT OF SIDE RAIL AND SQUARE BELL RESTRAINT. SEE NEXT ASSEMBLY DRAWING FOR ASSEMBLY DIMENSIONS.

REVISION			
LTR	DESCRIPTION	DATE	APPROVED
-	PRODUCT BASELINE ERR M9T3051	89-06-23	FRIEND
A	ECP M9T3082-006 89-08-16	90-09-24	DREIER
B	NOR M2T4200 92-07-20 (ECP M4T3005 94-06-02)	94-11-02	SCHULTZ
C	NOR M5T3003 95-06-22 (ECP M6R3006) 96-03-18	96-04-11	



C	C
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

DISTRIBUTION STATEMENT A.

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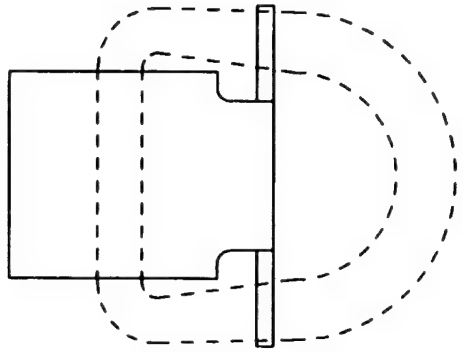
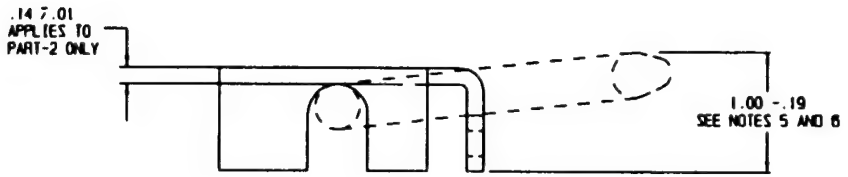
DISTRIBUTION IS UNLIMITED.

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES. BREAK SHARP CORNERS AND EDGES. TOLERANCES ON FRACTIONS ± DECIMALS .X ± .08 ANGULAR	DATE 89-03-13	DESIGN ACTIVITY U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND DEFENSE AMMUNITION CENTER AND SCHOOL SAVANNA, ILLINOIS 61074-9639	
	DRAWN JG / CHECKED MJJ / APPROVED DREIER		
	ENGINEER WM / JK T.J. MICHELS	LIFTING RING RETAINER	
	SUPERVISOR W. F. ERNST		
NEXT ASSY / USED ON APPLICATION	APPROVED JOHN L. BYRD, JR.	SIZE D / CAGE CODE 28620	AC200000806
		SCALE 2/1 / UNIT WT	SHEET 1 OF 2

PART NUMBER	A	B	C	D	E	F	G	H
AC200000806	1.75	2.86	.34	.70	1.46	.80	.86	.46
AC200000806-2	1.78	2.73 ?.02	.36 ?.02	.61	1.51	.73	.87 ?.03	NA

REVISION			
LTR	DESCRIPTION	DATE	APPROVED
-	PRODUCT BASELINE ERR M9T3051	89-06-23	FRIEND
A	NOR M2T4200 92-07-20 (ECP M4T3005 94-06-02)	94-11-02	SCHULTZ
C	NOR M5T3003 95-06-22 (ECP M6R3006) 96-03-18	96-04-11	





DISTRIBUTION STATEMENT A.

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION IS UNLIMITED.

		89-03-13	DESIGN ACTIVITY U.S. ARMY ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER (ARDEC) PICATINNY ARSENAL, NEW JERSEY 07806-5000
		DRAWN JG; CHECKED MJJ DREIER; PROJECT ENGR MH T.J. MICHELS; ENGINEER W. F. ERNST; APPROVED JOHN L. BYRD, JR.	LIFTING RING RETAINER
NEXT ASSY	USED ON	APPLICATION	SIZE B; CAGE CODE 28620; AC200000806; SCALE 2/1; UNIT WT; SHEET 2 OF 2

APPENDIX 60

UNITIZATION PROCEDURES FOR BOXED AMMUNITION AND COMPONENTS PACKED IN CYLINDRICAL METAL OR PLASTIC CONTAINERS ON 4-WAY ENTRY METAL PALLETS

2.75" HYDRA ROCKET, PACKED 4 PER PA150 CYLINDRICAL METAL CONTAINER, UNITIZED 12 PER 78.50" X 29.31" SPECIAL METAL PALLET; APPROX CONTAINER SIZE 78.50" L X 9.25 W X 9.25" H

NOTICE: THIS APPENDIX CANNOT STAND ALONE BUT MUST BE USED IN CONJUNCTION WITH THE BASIC UNITIZATION PROCEDURES DRAWING 19-48-4231-20PM1006.

DO NOT SCALE

U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY INDUSTRIAL OPERATIONS COMMAND

AMSTA-AR-ESK | AMSIO-TMJ

APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND

U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL

DRAFTSMAN	BETTY J. KUNDERT
ENGINEER	SANDRA M. SCHULTZ

SUPPLY ENGINEERING DIVISION	TRANSPORTATION ENGINEERING DIVISION	VALIDATION ENGINEERING DIVISION

LOGISTICS ENGINEERING OFFICE

APRIL 1994

REVISION NO. 1	MARCH 1996
SEE THE REVISION LISTING ON PAGE 2	

CLASS	DIVISION	DRAWING	FILE
19	48	4231/60	20PM 1006

PROJECT CA 243/60-87

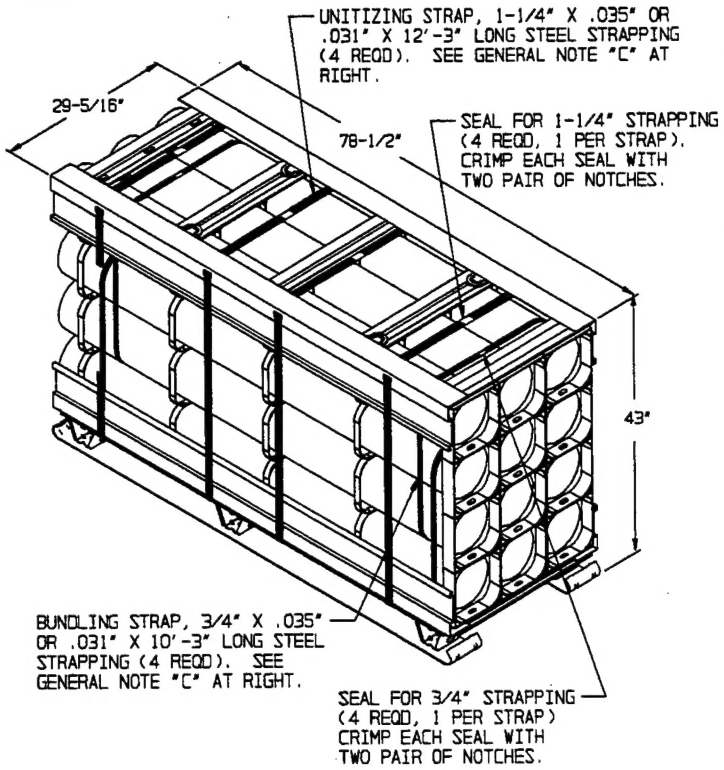
PALLET UNIT DATA				
ITEMS INCLUDED		HAZARD CLASS AND DIVISION ●		APPROX WEIGHT LBS
NSN	DODIC	DD CLASS	COMP GROUP	
1340-				
01-379-7814	H165			2,239
01-289-4719	H184			2,239
01-379-6347	H463	(04)1.2	G	2,239
01-379-7780	H463	(04)1.2	G	2,239
01-379-6350	H464	(09)1.2	E	2,239
01-379-7797	H464	(09)1.2	E	2,239
01-379-7889	H974	(04)1.2	G	2,239

● HAZARD CLASSIFICATION DATA CONTAINED IN THE ABOVE CHART IS FOR GUIDANCE AND INFORMATIONAL PURPOSES ONLY. VERIFICATION OF THE SPECIFIED DATA SHOULD BE MADE BY CONSULTING THE MOST RECENT JOINT HAZARD CLASSIFICATION SYSTEM LISTING OR OTHER APPROVED LISTING(S).

REVISION

REVISION NO. 1, DATED MARCH 1996, CONSISTS OF:

1. ADDING ITEM BY NATIONAL STOCK NUMBER TO "PALLET UNIT DATA" CHART.
2. CHANGING GENERAL NOTE "H" ON PAGE 3.
3. CHANGES IN ACCORDANCE WITH ECP MST3003.



PALLET UNIT

SEE GENERAL NOTE "B" AT RIGHT.

12 CONTAINERS OF 2.75 HYDRA ROCKETS (4 PER CONTAINER) AT 162 LBS	1,944 LBS (APPROX)
DUNNAGE	185 LBS
PALLET	110 LBS
TOTAL WEIGHT	2,239 LBS (APPROX)
CUBE	57.3 CU FT (APPROX)

BILL OF MATERIAL

METAL PALLET, 78.50" X 29.31"	1 REQD	110 LBS
TOP ASSEMBLY	1 REQD	90 LBS
BOTTOM ASSEMBLY	1 REQD	85 LBS
STEEL STRAPPING, 3/4" - 41.00'	REQD	2.93 LBS
STEEL STRAPPING, 1-1/4" - 49.00'	REQD	7.00 LBS
SEAL FOR 3/4" STRAPPING	4 REQD	NIL
SEAL FOR 1-1/4" STRAPPING	4 REQD	NIL

GENERAL NOTES

A. THIS APPENDIX CANNOT STAND ALONE BUT MUST BE USED IN CONJUNCTION WITH THE BASIC UNITIZATION PROCEDURES DRAWING 19-48-4231-20PM1006. TO PRODUCE AN APPROVED UNIT LOAD, ALL PERTINENT PROCEDURES, SPECIFICATIONS AND CRITERIA SET FORTH WITHIN THE BASIC DRAWING WILL APPLY TO THE PROCEDURES DELINEATED IN THIS APPENDIX. ANY EXCEPTIONS TO THE BASIC PROCEDURES ARE SPECIFIED IN THIS APPENDIX.

B. DIMENSIONS, CUBE AND WEIGHT OF A PALLET UNIT WILL VARY SLIGHTLY DEPENDING UPON THE ACTUAL DIMENSIONS OF THE CONTAINER AND THE WEIGHT OF THE SPECIFIC ITEM BEING UNITIZED.

C. BUNDLING STRAPS MUST BE TENSIONED AND SEALED PRIOR TO THE APPLICATION OF THE UNITIZING STRAPS. BUNDLING STRAPS MUST ALSO BE INSTALLED AS CLOSE TO THE OUTER RINGS AS POSSIBLE, TO AVOID DAMAGE TO THE CONTAINER.

D. ALTHOUGH THE CONTAINERS DEPICTED IN THE UNIT LOAD AT LEFT ARE CONSTRUCTED WITH INTERLOCKING DEVICES, THE INTERLOCKS WILL NOT FUNCTION PROPERLY UNLESS THE CONTAINERS ARE POSITIONED SO THAT THE "PINS" OF THE INTERLOCKS ARE FACING UPWARD. THIS ORIENTATION WILL AID IN THE PREVENTION OF CONTAINER MOVEMENT, BOTH LATERALLY AND LONGITUDINALLY, DURING SHIPMENT OF THE UNIT LOAD.

E. THE FOLLOWING AMC DRAWINGS ARE APPLICABLE FOR OUTLOADING AND STORAGE OF THE ITEMS COVERED BY THIS APPENDIX.

CARLOADING - - - - 19-48-4242/60-5PM1004
TRUCKLOADING - - - 19-48-4243/60-11PM1004
STORAGE - - - - - 19-48-4250-1-2-3-4-14-22PM1004
END OPENING ISO
CONTAINER - - - - 19-48-4245/60-15PM1009
MILVAN - - - - - - 19-48-4244/60-15PM1008
SIDE OPENING ISO
CONTAINER - - - - 19-48-4272/60-15PM1016

F. FOR METHOD OF SECURING A STRAP CUTTER TO THE PALLET UNIT, SEE AMC DRAWING 19-48-4127-20P1000.

G. IF ITEMS COVERED HEREIN ARE UNITIZED PRIOR TO ISSUANCE OF THIS APPENDIX, THE CONTAINERS NEED NOT BE REUNITIZED SOLELY TO CONFORM TO THIS APPENDIX.

H. FOR DETAILS OF THE PALLET AND PALLET ADAPTERS, SEE AMCCOM DRAWING ACV00156, MIL-A-70788 AND MIL-P-70786.

J. THE UNITIZATION PROCEDURES DEPICTED HEREIN MAY ALSO BE USED FOR UNITIZING 2.75" HYDRA ROCKETS WHEN IDENTIFIED BY DIFFERENT NATIONAL STOCK NUMBERS (NSN) THAN WHAT IS SHOWN ON PAGE 2, PROVIDED THE CONTAINER PACK DOES NOT VARY FROM WHAT IS DELINEATED HEREIN. THE EXPLOSIVE CLASSIFICATION OF OTHER ITEMS MAY BE DIFFERENT THAN WHAT IS SHOWN.

K. EMPTY OR REJECT PA150 CONTAINERS WILL BE USED AS FILLER CONTAINERS AS NECESSARY. FILLER CONTAINERS MUST BE INSTALLED IN THE MIDDLE OF THE TOP LAYER(S) OF CONTAINERS. IF FOUR FULL CONTAINERS ARE TO BE OMITTED, ONE FULL LAYER OF CONTAINERS WILL BE OMITTED. WHEN (REJECTED) FILLER CONTAINERS ARE USED IN PLACE OF OMITTED CONTAINERS TO COMPLETE A LAYER ON A PALLET, THEY WILL BE MARKED AS SPECIFIED WITHIN MIL-STD-129-1, EXCEPT WHEN (EMPTY/REPAIRABLE) CONTAINERS ARE USED IN PLACE OF OMITTED CONTAINERS TO COMPLETE A LAYER ON A PALLET; THE WORD "EMPTY" WILL BE STENCILED IN ORANGE ON THE EMPTY CONTAINER IN 1-INCH SIZE LETTERS. THE WORD "EMPTY" WILL BE STENCILED TWICE ON THE OPEN END PORTION OF THE CONTAINER WITH THE WORDS PAINTED ALONG THE CIRCUMFERENCE, 180 DEGREES APART, AND THREE TIMES ON THE BODY PORTION OF THE CONTAINER WITH THE WORDS PAINTED LENGTHWISE ON THE CONTAINER AND SPACED 120 DEGREES APART AS MEASURED AROUND THE CONTAINER CIRCUMFERENCE.

L. FOR DETAILS OF THE PA150 CONTAINER SEE PICATINNY DRAWING 12937856-2.